

IN THE SPECIFICATION:

At page 1, please amend the title as follows:

**METHOD AND ~~DEVICE~~SYSTEM FOR EXECUTING A
COMMUNICATION ATTEMPT TO
IN ACCORDANCE WITH
THE ATTAINABILITY STATUS OF A MOBILE TERMINAL DEVICE**

At page 1, prior to line 5, please add the following new paragraph and headings:

CROSS-REFERENCE TO RELATED APPLICATION

This application is the U.S. National Stage of International Application Number PCT/IB02/01044 filed April 2, 2002 and published in the English language on October 9, 2003 under International Publication Number WO 03/084260 A1 with International Search Report.

BACKGROUND OF THE INVENTION

1. Technical Field

At page 1, please amend the paragraphs beginning on line 6 through line 34 as follows:

The present invention relates to cellular communication networks having the option to send short messages. It also relates to a method to deliver communication attempts in accordance with the determined attainability of a mobile terminal device. The present invention relates to a method to deliver communication attempts to mobile terminal devices with a ~~minimised~~minimized use of wireless connections. The invention further relates to a mechanism inside a Short Message Service Centre~~Center~~ (SMSC) to provide notifications for calling applications or network devices for informing them if mobile devices are reachable or not, and if they are

reachable via General Packet Radio Service (GPRS) or Global System for Mobile communication (GSM).

2. Discussion of Related Art

Currently, in order to find out if a mobile terminal device is attainable, an application can send a Short Message (SM) to a handset and based on the result of the delivery of this SM the application knows if the handset is reachable or not. This implies also that the SM is actually delivered if the phone is reachable. Examples of this are push-type services which would benefit by not pushing to many subscribers when these are not reachable. E.g. a football score application would at the start of the match 'poll' all ~~one hundred thousand~~~~100000~~ fans ~~are mailed~~ and ~~reduce~~ the list down to just ~~twelve thousand~~~~12000~~ subscribers currently reachable. During the match, the amount of data pushed will be reduced dramatically and the resources used (without charging for it) is ~~minimised~~minimized.

Sometimes it would be desirable to know the ~~reachability~~reachability status without disturbing the terminal device. Presently, the SMs are sent anyway. There are some ways in the European Telecommunication Standard Institute (ETSI) specifications to send an SMS which the phone 'may discard' but it is not clear if all phones will comply with this procedure or not. In this case the air-interface capacity is used if the phone is reachable. In practice most applications just send all the stuff to all handsets and the SMSC capacity is wasted, and many more paging attempts are accordingly made as a result, ~~accordingly~~.

The standard procedures for delivering SMs can be found in the ETSI specifications for GSM and in the 3rd Generation Partnership Project (3GPP) specifications for the Short MessagesMessage Service (SMS).

At page 2, prior to line 5, please insert the following heading:

DISCLOSURE OF INVENTION

At page 2, please amend the paragraphs beginning on line 11 through 27 as

follows:

According to one embodiment of the invention a method, for executing a communication attempt with a mobile terminal device in accordance with the attainability status of said mobile terminal device in a cellular communication network is provided. The cellular network has a Short Message Service ~~Centre~~Center (SMSC), to manage and administer short messages (SM). The method is executed by querying said SMSC in said cellular network for obtaining an attainability status of said mobile terminal device and delivering said communication attempt to said mobile terminal device in accordance with said attainability status.

By querying the SMSC the information related to the attainability status can be obtained, and subsequently ~~an~~ a communication attempt can be delivered, if the attainability status meets the attainability demands of said communication attempt. The communication attempt can be one or more of the following : a SM, a plurality of SMs or ~~multi-messages (MMS)~~multimedia messages (MMs) of a multimedia messaging service (MMS) to be delivered, a fax, an email, a phone call to be executed. The delivery of the communication attempt can be a forwarding of one or more SMs, ~~MMSs~~MMs, emails faxes or phone calls. The delivery of said communication attempt may be notified by a message returned to the originator of the query. If the attainability is denied, the communication attempt is not delivered or at least postponed. If the attainability is confirmed the communication attempt is delivered or delivery is at least tried.

At page 3, please amend the paragraphs beginning on line 7 through line 26 as follows:

This is useful, if an application or a device wants to send a lot of SMs to a mobile terminal device e.g. multi-track midi-ringing tones, games, software downloads, phone-book (all two hundred~~200~~ entries) etc. it is useful to first find out if this would work or not.

A second example is a mass-delivery server which is adapted to deliver some messages (football scores, advertisements, and the like) to many subscribers (~~100~~one hundred thousand and more) and to ~~optimise~~optimize this, and wants to query who is

'online' to reduce the total volume. Preferably, if the state of a mobile station is determined as "not attainable" at the beginning of a (football) game, the whole following transmissions of actual scores of the game may be cancelled.

Advantageously, said connection related data are related to messages pending for delivery to said mobile terminal device. In the simplest case the network device e.g. queries an SMSC to find out if there are already SMs for a terminal device pending for delivery, and cancels or queues the delivery if there are SMs pending for delivery. If the device already rejected to receive a SM, an additional SM delivery would surely fail, and therefore may be ~~economised~~ economized. It may happen that the delivery of the SMS pending is delayed, because of a delay in the updating of the Home Location Register, or a delay in the updating of the SMSC, so the fact that there is one SM pending may not reflect the actual attainability state of the mobile terminal device. In case of e.g. ~~10~~ ten or more short messages pending, it can be sure that the mobile telephone is actually not attainable.

At page 3, please amend the paragraph beginning on line 33 through page 4, line 2 as follows:

Preferably, said data are related to the connection state of said mobile terminal device. So it can be determined, if the mobile terminal device can be connected via communication modes such as GSM, GPRS, UMTS and the like. This way some bulk transfers can be suppressed if they can not be delivered through GPRS. In this case an application or a device wants to know if the phone is online – or maybe connected for GPRS or not, and use that information for a communication attempt such ~~like~~ as sending a message, voicecalls, sending a fax, e-mails, Wireless Application Protocol- (WAP)-decks or something like that.

At page 4, please amend the paragraphs beginning at line 9 through line 29 as follows:

Preferably, said evaluation comprises the evaluation of data related to the communication to be attempted. So the kind of communication attempt and the amount of data to be delivered can be taken into account to decide if the mobile

terminal is actually attainable or not. So a single SM may be delivered, even if there are messages already pending, while a ~~MMS~~an MM may be cancelled, if the same number of ~~MSMMs~~ are pending.

Advantageously, said query is executed by initiating a mobile terminated delivery attempt to said SMSC. This embodiment of the invention allows an application to find out if a mobile terminal is attainable without actually contacting the mobile terminal. The SMSC does this by initiating the MT delivery attempt but not finishing it, ~~but telling~~Rather, it tells the application instead if the HLR thinks the handset is reachable or not. The method can be embodied by submitting an AO ("command cannot be actioned" or "reserved for future use") message to the SMSC with a special flag to activate the "query-HLR-status-only". The SMSC checks its own information if the MS is reachable; if other messages are pending already and currently no delivery attempt is made, the SMSC can send the 'not-reacheable' info back using the last known mobile terminated (MT)-delivery attempt reason (e.g. "absent subscriber"). Otherwise the SMSC asks the HLR for the routing information. The HLR reply actually tells where the mobile is, but also if the mobile is reachable or not. It can also tell if the mobile can be reached via the GPRS network or through the GSM network. The SMSC in this case would not do the usual: it does not actually deliver the MT message to the mobile terminal (if reachable), but generates the notification back to the application or network device and deletes the message.

At page 5, please amend the paragraph beginning on line 18 as follows:

According to another embodiment of the invention a Short Message Service ~~Centre~~Center (SMSC) is provided, that is capable of executing the steps of the method of the preceding description. The SMSC is connected to a cellular communication network that comprises a Home Location Register (HLR). The SMSC comprises components for receiving messages, forwarding messages, and querying HLR data of a mobile terminal device. The SMSC further comprises components for obtaining data related to the attainability status of a mobile terminal device, and delivering messages according to said obtained data related to the attainability status of said terminal device.

At page 6, prior to line 20, please insert the following heading:

BRIEF DESCRIPTION OF THE DRAWINGS

At page 6, prior to line 33, please insert the following heading and amend the paragraph beginning on line 33 through page 7 line 12 as follows:

BEST MODE FOR CARRYING OUT THE INVENTION

Figure 1A is a flowchart of the conventional delivery of an SM in a cellular communication network. In the first step a service ~~center~~center (SC) 40 transfers a message 60 to a short message service ~~center~~center (SMSC) 42. The SMSC 42 receives the SM and inspects the parameters. The SMSC 42 may be identical to, or be incorporated in a mobile service ~~center~~center (MSC). The SMSC 42 queries 62 the home location register (HLR) 44, and transfers 64 the SM to the MSC 46 using the routing information obtained from the HLR 44, if no errors occur. When receiving a SM from the SMSC 42, the MSC 46 retrieves 66 from the visitor location register (VLR) 48 location area address information and, when appropriate, error information. If no errors are indicated by the VLR 48, the SM is transferred 68 from the MSC 46 to the mobile station (MS) 50. Then the MS 50 transfers 68 a confirmation that the SM is received by the MS 50 to the MSC 46. The MSC 46 then relays the delivery confirmation to the SMSC 42 in a delivery report 70. When receiving the report 70 associated with said SM from the MSC 46, the SMSC 42 ~~notifies~~notifies the HLR 44 of the successful delivery via the MSC 46, and creates and sends the successful report 74 to the SC 40. ~~This~~These steps are executed if no errors occur during the delivery of the SM. If e.g. the MS 50 rejects the SM since e.g. it has no memory capacity available to store the message, or for any other reason, all these steps are futile and network and air time resources are wasted.

At page 7, please amend the paragraphs beginning on line 26 through page 8, line 7 as follows:

The SMSC 42 in this case would not do the usual, in that it does not actually deliver the mobile terminated (MT) message to the MS 50 (if reachable), but generates the notification 84 back to the SC 40 and deletes the message. Preferably, the SC 40 can

start to send 60 an SM or ~~Multi-SM~~Multi-SMs for delivery, as described in fig 1A. Preferably, the SMSC 42 can deliver 62 the SM by itself, e.g. after confirmation from the SC 40.

Figures 2A and 2B are block diagrams a cellular network architecture with an indication of the steps necessary to determine the attainability of a mobile terminal device according to the ~~sate~~state of the art and according to an embodiment of the present invention. In figure 2A a section of a conventional cellular network is depicted with a mobile station (MS) 50, two base stations 10, 12 and a base station controller (BSC) 14 a mobile switching ~~cent~~center (MSC) 46. The MSC 46 is connected to home location register (HLR) 44, a visited location register (VLR) 48 and other data bases like equipment identity register and an authentication ~~cent~~center, ~~concurrent~~concurrently designated with the reference numeral 22. The MSC 46 is connected to a short message service ~~cent~~center (SMSC) 42. The SMSC 42 can be a SMS-GMSC, a SM-service gateway MSC, connecting an service ~~cent~~center (SC) 40 e.g. in the internet with the SMSC 42. The SC 40 can be located in the cellular network or in adjacent network. Preferably, the MSC the SMSC and the SC can be implemented in a single network device. The connections required to deliver a standard SMS are indicated by bold double arrows.

At page 8, please amend the paragraph beginning on line 13 as follows:

The invention provides the following advantages for the service provider :

- [[-]] ~~The~~the attainability notification is sent to the application without using any air-interface resources and without leaving any trace in the ~~handset~~handset;
- [[-]] ~~Applications~~applications can find out if a phone can be contacted via GPRS now. This might stimulate application originated GPRS based ~~services~~services; and
- [[-]] ~~No~~no changes are required to GSM/GPRS network elements or mobile terminals; only the SMSC is ~~affected~~affected.

At page 8, please amend the paragraph beginning on line 28 as follows:

It is to be noted that the method can be used to simply track a mobile terminal

device, to track its motion, without disturbing the mobile terminal simply by repeatedly executing the method according to the invention. In this case the communication attempt is cancelled anyway, and a notification to a network device is generated and ~~sendsent~~, (e.g. periodically) notifying the actual position and attainability of said mobile terminal device.

At page 9, please amend the paragraph beginning on line 4 as follows:

It is further to be noted that the SMSC can be a SMS-GMSC, a Short Message System – Gateway Mobile service Switching ~~Centre~~Center, providing a gateway option to other data networks, like e.g. the internet, or a local area network of a news or data provider.